Citation:

Gazzaniga JM & Burns TL. Relationship between diet composition and body fatness, with adjustment for resting energy expenditure and physical activity, in preadolescent children. *Am J Clin Nutr* 1993; 58: 21-8.

PubMed ID: 8317384

Study Design:

Prospective Cohort Study

Class:

B - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To assess the relationship between diet composition & body fatness in preadolescent children, after adjustment for resting energy expenditure (REE) & physical activity.

Inclusion Criteria:

Subjects were initially selected on the basis of their relative weight from the Muscatine Coronary Risk Factors Project.

Two groups of children were identified for the study:

1. children with a body weight between 90 & 110% (n=32) of the median weight for sex, height & age
2. children with a body weight > 120% (n=21) of the median weight for sex, height & age.

After initial subject selection, study group status was further verified on the basis of the TSF-thickness measurements from the clinic. Obese $\geq 85^{th}$ % & Nonobese < 85^{th} %.

Exclusion Criteria:

children with no medical history of any endocrine, metabolic, or other physical or psychological disorders.

Description of Study Protocol:

Children were selected from among participants in a school survey conducted as part of the Muscatine Coronary Risk Factors Project. Each subject had height, weight, TSF & subscapular-skinfold thickness & REE measured, & was educated about the dietary &

physical-activity recalls 1 morning in the clinic office. Dietary & physical-activity recalls were taken by telephone on 3 consecutive evenings after the clinic visit.

Data Collection Summary:

Dependent: % Body Fat estimated by taking average of two skinfold thickness measurements, triceps & subscapular & subject's sex, age & ht/wt (measured following standardized protocol).

Independent:

- Dietary intake: % of total energy from Dietary Fat: saturated, polyunsaturated & monounsaturated fatty acids, Carbohydrates & Protein (3 consecutive 24-h recalls);
- Physical activity (self-report of activity for the same 3 d that dietary intake was assessed);
- REE (indirect calorimetry).

Control Variables: Gender, REE, Energy expended for physical activity & Age & Body weight (for total energy analysis).

Statistical Analysis: Pearson correlation coefficients & Multiple-regression analysis.

Description of Actual Data Sample:

Original Sample: 53 preadolescent children.

Withdrawals/Drop-Outs: 5 excluded on basis of inclusion criteria.

Final Sample: 48 children (23 boys, 25 girls) – 30 nonobese children, 18 obese children.

Location: Iowa City, Iowa.

Race/Ethnicity: white children.

SES: not specified.

Age: 9-11y

Summary of Results:

Total Energy:

The nonobese subjects tended to consume less energy in a 24-hour period than did the obese subjects. However, when body weight was considered nonobese girls had greater energy intake than did the obese girls. Similar differences were observed between the groups of boys.

Daily energy intake was sig. & inversely related to %BF ($P<0.001$).

% Nutrient Intake of Daily Energy:

The obese children consumed a sig. greater proportion of their energy in the form of dietary fat & saturated & unsaturated fatty acids, & a sig. lesser proportion in the form of carbohydrate than did

the nonobese children.

Protein was the only macronutrient that did not differ sig. in its proportion of intake between study groups.

Author Conclusion:

These data suggest that diet composition, independent of total energy intake, REE & physical activity may contribute to childhood obesity.

Reviewer Comments:

Limitations

- *Case-control study design.*
- *Small sample size.*
- *Older article (1993) therefore used TSF as obesity indicator rather than BMI/age.*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	Yes
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	Yes

Validity Questions

1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes

2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	No
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	Yes
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes

5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	No
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes

	7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**		Yes
	8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
	8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
	8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
	8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
	8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
	8.6.	Was clinical significance as well as statistical significance reported?	Yes
	8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**		Yes
	9.1.	Is there a discussion of findings?	Yes
	9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**		Yes
	10.1.	Were sources of funding and investigators' affiliations described?	Yes
	10.2.	Was the study free from apparent conflict of interest?	Yes